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EXAMINER	
D AGOSTA, STEPHEN M	

ART UNIT	PAPER NUMBER
2683	9

DATE MAILED: 08/27/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/652,773	JACOBSEN, ERIC A.	
	Examiner	Art Unit	
	Stephen M. D'Agosta	2683	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 28 July 2003 .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-33 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-33 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Response to Arguments

Applicant's arguments with respect to claims 1-33 have been considered but are moot in view of the new ground(s) of rejection.

1. The examiner has provided pertinent art and reasons why the art reads on the applicant's claimed invention. The applicant has chosen not to amend the claims in a more narrow fashion. Hence, since the examiner has not been provided with any argument(s) that are persuasive enough to overcome his rejection (two new references, OWEN and RODAL, have been added to re-emphasize the rejection).

2. The IDS has NOT been considered because copies of the art were not provided/received.

3. With regard to the applicant's recurring statement that there is no suggestion to modify Daniel, the examiner provided significant motivations for the USC 103 combinations per the last office action (dated 5-6-03).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 3-5, 7-16, 18-23, 25-27, *28-29 and 31-33* rejected under 35 USC 103(a) as being unpatentable over Daniel et al. U.S. Patent 6,075,484 in view of Grubb et al. U.S. Patent 5,768,684 and Yun U.S. Patent 6,463,295 ***and OWEN et al.***

US 6,421,007 or Kaminski US6,239,747 or Thibault et al. US 6,240,098 (hereafter referred to as Daniel, Grubb and Yun ***and Owen or Kaminski or Thibault***).

As per **claims 1, 16 and 22, *28 and 31***, Daniel teaches a system for wireless transmission comprising:

An array of transmit antenna elements (figure 3, #310)

A direction determination unit [DDU] (figure 3, #340)

A transmit beamformer to generate a transmit beam in the direction of the remote transceiver (figure 3, #330) [eg. using well known phased array principles as disclosed by the applicant in the specification page 5, L9-18)]

But is silent on a power control unit (PCU) to determine antenna gain parameter and adjust transmit power based on antenna gain parameter

Grubb teaches bi-directional power control in a communications system whereby each station adjusts it own transmission power level based on signal quality indications (abstract). The examiner interprets the stations as having power control units that perform this operation.

Yun teaches power control for a communication station with a multiple antenna array (abstract).

Further to this point is Owen, who teaches direction determination of an RF signal (eg. cellular), at least antennas connected to a processor for extracting the signal and it's direction whereby the processor controls the beam form of the downlink in response to the direction estimate and accuracy (abstract and fig. 1). Similarly both Kaminski and Thibault teach different embodiments of communications using an antenna array, direction finding and signal "pointing/steering" for optimal RF communications.

It would have been obvious to one skilled in the art at the time of the invention to modify Daniel, such that the system has a power control unit, so that the optimally steered/beamformed antenna array also uses power control for best possible transmitted/received signal quality.

As per **claims 3 and 18** ***and 33***, Daniel teaches claim 1/***28*** **but is silent on** wherein the PCU adjusts transmit power level to comply with mandated transmit power levels.

Grubb teaches power control for maintaining a minimum transmission power level which is interpreted as keeping the power levels within allowable/mandated power levels.

It would have been obvious to one skilled in the art at the time of the invention to modify Daniel, such that transmit power complies with mandated transmit power levels, to ensure the system stays within regulated/licensed operating limits.

As per **claim 4**, Daniel teaches claim 1 wherein said array of transmit antenna elements, said direction determination unit and transmit beamformer are each part of an adaptive antenna element (figure 3, #310, #330 and #340 depict this as one system).

As per **claims 5 and 20**, Daniel teaches claim 1 further comprising an array of receive antenna elements that are arranged in a predetermined pattern for use in receiving a signal from the remote transceiver wherein said DDU includes means for analyzing signal portions received by individual antenna elements within said array of receive elements to determine the direction of the remote transceiver (figure 3, two #312 elements are receive antennas and #340 is the DDU].

As per **claims 7** ***and 29***, Daniel teaches claim 6/*28* and a controller (figure 3, #350) **but is silent on** wherein said PCU calculates antenna gain related parameter based upon delay setting of said transmit beamformer.

Grubb teaches bi-directional power control in a communications system whereby each station adjusts it own transmission power level based on signal quality indications (abstract). The examiner interprets the stations as having power control units that perform the operation of calculating gain/BER/RSSi/SNR.

It would have been obvious to one skilled in the art at the time of the invention to modify Daniel, such that the PCU calculates an antenna gain parameter based upon the delay setting, to provide optimal RF transmission to a transceiver based upon its location/direction in view of the antenna beamformer.

As per **claim 8**, Daniel teaches claim 1 and that the DOA information must be precise (C2 , L28-35) and the beamformer implements beam forming and beam steering function necessary to form antenna beam patterns with the desired characteristics (C6, L41-46) [eg. wherein said transmit beam generated by said transmit beamformer is approximately centered in the direction of the remote transceiver determined by said DDU].

As per **claim 9**, Daniel teaches claim 1 **but is silent on** comprising an input/output interface to couple said system to a data processing device.

Daniel teaches that the DOAE is coupled to the DBF which is coupled to the controller and digital data is exchanged between the DOAE, DBF and controller (C7, L8-16). Daniel also teaches that the DOAE is used to compute various values (C7, L25-32) and that the DOAE comprises one or more parallel processors (C7, L33-42). Hence the examiner interprets any processor as having a data port which an engineer can connect to in order to gather/view data. One skilled in the art would also couple it to a data processing device as well.

It would have been obvious to one skilled in the art at the time of the invention to modify Daniel, such that the system can interface to a data processing device, to provide data to a technician (or user) for viewing on a computer screen or printout.

As per **claim 10, 11 and 12**, Daniel teaches claim 1 **but is silent on** comprising a serial port, USB port or plug and play capability.

Daniel teaches that the DOAE comprises one or more parallel processors (C7, L33-42). Hence the examiner interprets any processor as having a data port (ie. serial, parallel, USB, LAN, wireless, etc.) which an engineer can connect to in order to gather/view data. One skilled in the art would also expect that said port had plug-and-play capability as is typically available on many/most computer systems today.

It would have been obvious to one skilled in the art at the time of the invention to modify Daniel, such that the system comprises a serial port, USB port or plug-n-play capability, to ensure that it utilizes industry-standard hardware and software which allows it to interoperate with a plethora of other commercially available devices.

As per **claim 13**, Daniel teaches claim 1 wherein the antenna array, DDU and beamformer are each mounted on a common support structure (figure 1 shows these elements as one system) **but is silent on** and the PCU.

Grubb teaches bi-directional power control in a communications system whereby each station adjusts it own transmission power level based on signal quality indications (abstract). The examiner interprets the stations as having power control units that perform this operation.

The examiner interprets the layout of the physical system as a **design choice** in which all parts mentioned above are mounted on a common structure.

It would have been obvious to one skilled in the art at the time of the invention to modify Daniel, such that it contains a PCU, to provide means for the system to control it's transmit power for optimal RF transmission as the environment dictates.

As per **claim 14**, Daniel teaches claim 14 and, while little details are provided regarding the actual size of the system, does not preclude the size of the system as being relatively small. Hence, one skilled in the art would be able to build the system such that it can be placed anywhere (eg. wherein said common structure is adapted for desktop placement).

As per **claim 15**, Daniel teaches claim 1 **but is silent on** a variable gain amplifier.

Grubb teaches bi-directional power control in a communications system whereby each station adjusts it own transmission power level based on signal quality indications (abstract). The system uses a variable gain amplifier (figure 7, #118).

It would have been obvious to one skilled in the art at the time of the invention to modify Daniel, such that the system uses a variable gain amplifier, to ensure the RF signal can be variably controlled as dictated by the user's environment.

As per **claim 19**, Daniel teaches claim 18 **but is silent on** using said antenna gain parameter to maximize said power level while not exceeding mandated transmit power levels.

Grubb teaches power control for maintaining a minimum transmission power level which is interpreted as keeping the power levels within allowable/mandated power levels. The examiner notes that there is little difference between Grubb's "minimum" transmit power and the applicant's "maximum power" because both ensure that the SNR/BER of the received signal can be correctly demodulated and understood. One skilled in the art would be able to adjust the power to a maximum value as well – although this would require more batter/AC power.

It would have been obvious to one skilled in the art at the time of the invention to modify Daniel, such that the antenna gain maximizes power but does not exceed mandated transmit power levels, to ensure the invention stays within regulated/licensed operating transmit power limits.

As per **claim 21**, Daniel teaches claim 16 and the system appears to be located at a ground station (figure 1, #120, #130, #140, #170, #180) shows the system communicating with a satellite) [eg. perform calculations from a single indoor location]

As per **claim 23,** Daniel teaches claim 22 **but is silent on** wherein the parameter associated with said transmit beam includes an antenna gain related parameter.

Grubb teaches bi-directional power control in a communications system whereby each station adjusts it own transmission power level based on signal quality indications (abstract). The examiner interprets the stations as having power control units that calculates signal quality/antenna gain parameters.

It would have been obvious to one skilled in the art at the time of the invention to modify Daniel, such that an antenna gain related parameter is associated with the transmit beam, to ensure that antenna gain can be a parameter that is modified as needed for optimal RF transmission.

As per **claim 25**, Daniel teaches claim 22, an array of transmit antenna elements (figure 3, #310) and a transmit beamformer that generates a transmit beam in the direction of the remote transceiver (figure 3, #330) [eg. using phased array techniques].

As per **claims 26 *and 32***, Daniel teaches claim 22/***28***, wherein said adjustable beamformer is part of an adaptive antenna arrangement (figure 3, #310 and #330).

As per **claim 27**, Daniel teaches claim 22 wherein said PCU adjusts the power level of the maximum allowed power is not exceeded.

Grubb teaches power control for maintaining a minimum transmission power level which is interpreted as keeping the power levels within maximum allowed power levels.

It would have been obvious to one skilled in the art at the time of the invention to modify Daniel, such that the PCU controls power level to not exceed maximum allowed, to ensure the system stays within regulated/licensed operating limits.

Claim 6 rejected under 35 U.S.C. 103(a) as being unpatentable over Daniel/Grubb/Yun as applied to claim 1 above, and further in view of Bolgiano et al. U.S. Patent 5,663,990 (hereafter referred to as Bolgiano).

As per **claim 6**, Daniel teaches claim 1 **but is silent on** wherein said transmit beamformer includes a variable delay unit for each of said antenna elements within said array of transmit antenna elements and a controller to determine a delay setter for each variable delay unit based upon the direction of the remote transceiver determined by the DDU.

A RAKE receiver takes into account variable delay signals being received based upon location/direction of a subscriber and multipath fading of the RF signals.

Bolgiano teaches a system with self-calibration. Once every minute the system queries each check point. This results in a distance measure being sent to the check point where the check point receiver adds the code offset measurements and sends the contents of the location file to the processor where the received file is compared with a file that contains the correct measurements. If the difference exceeds the threshold the

processor calculates the changes in delay that are required to bring the measurements within tolerance and passes the correction to the controller. The controller maintains a file that includes the variable delay to be inserted for each antenna. The controller changes the delay entry in the file and a new measurement is taken to validate the calibration. Changes that require significant changes in delay are unlikely, but if this should happen the controller would not initiate any measurements that include the leg that is under recalibration. Thus, the position location capability also provides a service for the communication system (C25, L1-21).

It would have been obvious to one skilled in the art at the time of the invention to modify Daniel, such that the beamformer has a variable delay unit which determines a delay based upon direction of the remote transceiver, to ensure that RF signals transmitted in a certain direction (eg. to the transceiver) are adjusted with variable delay(s) for optimal transmission.

Claims 2, 17 and 24 *and 30* rejected under 35 U.S.C. 103(a) as being unpatentable over Daniel/Grubb/Yun as applied to claim 1 above, and further in view of Roddy et al. U.S. Patent 6,127,740 ***and Rodal US 5,650,785*** (hereafter referred to as Bolgiano).

As per **claims 2, 17 and 24** ***and 30***, Daniel teaches claim 1 **but is silent on** further comprising a duty cycle unit to determine average transmit duty cycle over a predetermined time and to deliver said average transmit duty cycle information to the PCU to adjust transmit power level of said system.

Roddy teaches a controller that determines the average duty cycle of the desired transmitted signal. The carrier frequency of the intended transmission, which preferably is previously preprogrammed into the controller is then utilized with the determined average duty cycle and the other fixed values and offsets to determine a proper power control signal duty cycle for adjusting the signal strength of the transmitted signal. Determining the necessary characteristics of the power control signal is accomplished,

in one example, by utilizing a pre-stored look up table that is programmed into a memory portion of the controller. In another example, mathematical formulas are utilized by the controller to determine the duty cycle of the power control signal based upon the determined signal and circuit factors (C4, L44-62). ***Further to this point is Rodal who also teaches duty cycle factor (abstract).***

It would have been obvious to one skilled in the art at the time of the invention to modify Daniel, such that a duty cycle unit is used to determine average transmit duty cycle, to provide means for the PCU to adjust transmit power level as needed for optimal wireless transmission/reception.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen M. D'Agosta whose telephone number is 703-306-5426. The examiner can normally be reached on M-F, 8am to 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bill Trost can be reached on 703-308-5318. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9314 for regular communications and 703-872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-306-0377.

SMD
August 7, 2003

WILLIAM TROST
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